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| 09/601,515 | 08/02/2000 | Haruhiko Motohashi | 0162/00564 | 3956 |

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Morris Liss
Pollock Vande Sande & Amernick
PO Box 19088
Washington, DC 20036-3425

| EXAMINER | |
|---|---|
| MICHALSKI, JUSTIN I | |
| **ART UNIT** | **PAPER NUMBER** |
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DATE MAILED: 05/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/601,515 | MOTOHASHI ET AL. | |
| | Examiner | Art Unit | |
| | Justin Michalski | 2644 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on 2/18/2004.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) 1-35 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) 1-14 is/are allowed.

6)☒ Claim(s) 15-35 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 9.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Drawings*

1. The corrected drawings were received on 01/05/2004. These drawings are acceptable.

### *Response to Arguments*

2. Applicant's arguments, see page 15, filed 01/05/2004, with respect to Claim 1 have been fully considered and are persuasive. The applicant argues as stated in claim 1 of the instant application that only a double-numbered overtone component of the desired fundamental tone of the bass musical instrument is passed and the frequencies lower than or equal to the fundamental tone as well as the signal frequencies above the double-numbered overtone are suppressed. The 102(a) rejection under Aarts et al. of Claim 1 has been withdrawn.

3. Applicant's arguments, page 15, filed 01/05/2004, with respect to Claims 15 and 24, have been fully considered but they are not persuasive. The Office respectively disagrees with the applicant's arguments that Aarts et al. (Hereinafter "Aarts") does not disclose selecting a harmonic overtone component. Claims 15 and 24 claim selecting a double overtone component and a double overtone frequency region respectively. Aarts discloses Figure 1 comprising filter 20 which Aarts discloses may be a band-pass filter for selecting a part of the frequency spectrum of the audio signal (Column 60-62) and selecting a frequency band of the audio signal (Column 1, lines 12-13). The band-

pass filter 20 can be selected to pass frequencies in a region which includes a frequency region containing a double overtone component of the input audio signal.

4. Applicant's arguments, pages 15-16, filed 01/05/2004, with respect to Claims 18, 19, 28, and 32-34 have been fully considered but they are not persuasive. The Office respectively disagrees with the applicant's arguments that Jackson does not provide a boost to a base signal, selecting a component corresponding to a double or higher overtone, and applying distortion which has an s-shaped response. Claims 18 and 28 claim selecting a component corresponding a double or higher overtone and selecting a component corresponding to double overtone region respectively. Jackson discloses a device (Figure 4) which consists of a bandsplitter 74. Jackson discloses that the bandsplitter may route low pass output (i.e. inherent inclusion of double overtone region) (Column 21, lines 45-47) through to amplifier 66A. Jackson further discloses that the bandsplitter may consist of a high pass filter (Column 22, lines 3-11) which passes frequencies in the upper mid-range and above which will inherently include components corresponding to a double or higher overtone of the audio signal. Further, Figure 4 discloses amplifiers 80, 66A, and 72A which will provide a boost to a base signal. Jackson also discloses distortion function 68A which distorts the audio signal from bandsplitter (i.e. filter or selector) and amplifier 66A using responses shown in figures 20b and 20d. Figure 20b shows the response as an s-shape with the slope of the response becoming zero as the input approaches +1. Figure 20d also shows the response as s-shaped.

5. Applicant's arguments, pages 17-19, filed 01/05/2004, with respect to claims 16, 17, 20, 21, 26, 27, 29, 30, 31, and 35 have been fully considered but they are not persuasive. The applicant argues that the claims carry the limitations of independent claims 15, 18, 24, and 28. In view of the response to arguments above the rejections of claims 16, 17, 20, 21, 26, 27, 29, 30, 31, and 35 are upheld.

### *Claim Rejections - 35 USC § 102*

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

7. Claims 15, and 22-25 are rejected under 35 U.S.C. 102(e) as being anticipated by Aarts et al. (US Patent 6,111,960).

Regarding Claim 15, Aarts et al. discloses an acoustic effect apparatus (Fig. 1) comprising a narrow-bandpass filter (filter 20) (Aarts et al. discloses that filter 20 may also be a band-pass filter (Column 4, lines 60-62) and selecting means for selecting a frequency band (Column 1, lines 12-13) which could include a narrow-bandpass filter) for picking out a double overtone component of a desired fundamental tone of a bass musical instrument from an audio signal which is input from an input terminal (terminal 10); and distortion applying means (generator 22) for receiving the double overtone component which is picked out by the narrow-bandpass filter for applying a non-linear distortion (Aarts et al. discloses the generator may be replaced by another non-linear device to generate harmonics (i.e. distortion) (Column 5, lines 4-7) to the double overtone component.

Regarding Claim 22, as stated above apropos of Claim 15, Aarts et al. anticipates all elements of that claim. In addition, Aarts et al. further discloses an acoustic effect apparatus (Fig. 1) comprising a summer (summer 26) for summing an output signal from the distortion applying means and the input audio signal from the input terminal for delivery to an output terminal (terminal 12).

Regarding Claim 23, Aarts et al. further discloses a acoustic effect apparatus (Fig. 1) comprising a low pass filter (reference 24, Aarts et al. discloses a bandpass filter for attenuating low and high frequency components (Column 4, lines 62-64) (i.e. bandpass filter could be adjusted to attenuate components equal or greater than 200Hz.) which is fed with an output signal from the distortion applying means (generator

22) and which provides a gentle attenuation of components substantially equal or greater than 200Hz before feeding the summer (summer 26).

Regarding Claim 24, Aarts et al. discloses a step of picking out a component to a double overtone region of a bass musical instrument such as a bass or a bass drum (Aarts et al. discloses a step for selecting a frequency band of an audio signal (Column 1, lines 21-27), frequency band could correspond to a double overtone region) from an input audio signal from an input terminal (reference 10) by means of filter means (filter 20); and a step of applying a non-linear distortion to the component corresponding to the double overtone region which is picked out by means of distortion applying means (Aarts et al. discloses a step for generating harmonics of a signal, i.e. distortion, selected by a filter (Column 1, lines 21-27).

Regarding Claim 25, Aarts et al. further discloses a step of summing the double overtone region component to which the non-linear distortion (Aarts et al. discloses generator 22 may be a non-linear device) (Column 5, lines 4-7) is applied and the input audio signal together for delivery (Column 1, lines 21-27).

8. Claims 18, 19, 28, 32-34 are rejected under 35 U.S.C. 102(e) as being anticipated by Jackson (US Patent 6,504,935).

Regarding Claim 18, Jackson discloses an acoustic effect apparatus (Fig. 4) comprising a highpass filter (reference 74, Jackson discloses bandsplitter can be replaced by high-pass filter) (Column 22, lines 3-11) for picking out a component corresponding a double or higher overtone of a bass musical instrument (Jackson

discloses the use for distortion only to frequencies in upper mid-range and above, i.e. higher overtones of a bass musical instrument) (Column 22, lines 1-5) from an audio signal which is input from an input terminal (input 42A); and distortion applying means (distortion function 68A) for receiving the component corresponding to the double or higher overtone which is picked out by the high pass filter (filter 74) and for applying a non-linear distortion to the component corresponding to the double or higher overtone; the distortion applying means having an input-output response which is a non-linear response having no point symmetry with respect to the center of an input amplitude (Jackson discloses distortion function Fig. 20b which is non-linear and asymmetric).

Regarding Claim 19, Jackson further discloses an acoustic effect apparatus (Fig. 4) in which the non-linear response is an input-output response which is S-shaped with respect to a rectilinear line representing a linear response (distortion function Fig. 20b) and which is defined by a curve having no point symmetry with respect to a reference point of an input and an output.

Regarding Claim 28, Jackson discloses a recorded medium having a program recorded thereon for execution by a computer of an acoustic effect apparatus (Jackson discloses method using digital techniques (i.e. computer) Column 3, lines 6-9), the program including processing for downloading audio data (Jackson discloses storage and recall of data) (Column 3, lines 19-22); filter processing for picking out a component data corresponding to the double overtone region of a bass musical instrument such as a bass or a bass drum from the downloaded audio data; and distortion applying processing which applies a non-linear distortion to the component data corresponding to

the double overtone region which is picked out (Jackson discloses the use for distortion only to frequencies in upper mid-range and above, i.e. overtones of a bass musical instrument) (Column 22, lines 1-5).

Regarding Claim 32, Jackson further discloses a distortion applying process (Figure 20b) which having an input-output response which is a non-linear response having no point symmetry with respect to the center of an input amplitude.

Regarding Claim 33, as stated above apropos of claims 28 and 30, Jackson anticipated all elements of those claims. Jackson further discloses distortion applying processes which a reference is made to a table having non-linear input-output responses (Jackson discloses distortion models (i.e. tables) can be stored for later recall) (Column 3, lines 19-22) recorded therein in terms of the component data corresponding to the double region which is picked out to deliver output data.

Regarding Claim 34, as stated above apropos of claims 28 and 30, Jackson anticipated all elements of those claims. Jackson further discloses a distortion process (Column 3, lines 19-22) which calculates a non-linear function (Figure 19d) using a variable defined by the component data corresponding to the double overtone region which is picked out to deliver output data (Jackson discloses storage of distortion models for later recall) (Column 3, lines 19-21).

### *Claim Rejections - 35 USC § 103*

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Aarts et al. as applied to claim 15 above in view of Tanaka et al. (US Patent 5,850,460). Aarts et al. does not disclose the cutoff response on the bass side of the filter means to be on the order of +12dB/OCT. Tanaka et al. discloses a speaker system with an attenuation curve which is approximately 12 dB/OCT at both low and high frequency ranges (Column 2, lines 26-28). Tanaka et al. teaches that this provides a bandpass characteristic suitable for a bass speaker (Column 2, lines 28-30). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to choose a cutoff response on the base side of the filter means to be on the order of 12dB/OCT in order to provide a characteristic that is suitable for a bass frequency.

11. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Aarts et al. as applied to claim 15 above in view of Jackson (US Patent 6,504,935). Aarts et al. discloses a distortion applying means but does not disclose the input-output response being asymmetric and S-shaped. Jackson discloses an input-output response (Fig. 20b) which is S-shaped with respect to a rectilinear line representing a linear response and which is defined by a curve having no point symmetry with respect to a reference point of an input and an output.

12. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jackson as applied to claim 18 above in view of Tanaka et al. (US Patent 5,850,460). Jackson discloses an acoustic effect apparatus but does not disclose the high pass filter with a cut-off frequency of about 200Hz and response substantially equal to 12dB/OCT. Tanaka et al. discloses a base speaker with an upper cut-off frequency of approx. 200Hz (Fig. 14). Tanaka further discloses the attenuation curve is approximately 12 dB/OCT providing a characteristic suitable for a bass speaker (i.e. bass frequencies). It is known in the art that overtones (i.e. harmonics) have frequencies greater than their fundamental frequency. In order to obtain the harmonics of bass sounds which are input to speaker response 14, frequencies of greater than 200 Hz would have to be obtained. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a filter which has a cut-off frequency of about 200Hz in order to pick out the overtones of bass frequencies and using a suitable cut-off response for bass frequencies substantially equal to 12dB/OCT in order to efficiently pick out the overtones of bass frequencies.

13. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jackson as applied to claim 18 above, and further in view of Iwamatsu (US Patent 5,040,220).

Jackson discloses an acoustic effect apparatus with a high pass filter. Jackson does not disclose the high pass filter having a small peak formed on a shoulder located adjacent to a cut-off frequency of its amplitude-frequency characteristic curve. Iwamatsu discloses a filter means where the Q value can be adjusted (Column 11, lines

63-64) thereby allowing the sharpness of resonance of each filter to be set (i.e. the peak adjacent to cut off frequency) (Fig. 6, Column 11, lines 49-50). Iwamatsu shows in Fig. 6 that as Q increases the level of signal is passes. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have a high-pass filter where a peak existed in order to vary the sharpness of resonance of the filter (i.e. increase the gain at a certain frequency) in order to produce an output where a greater amount of certain wanted frequencies are passed to be processed at a greater amount than signals of other frequencies resulting in a more accurate signal.

14. Claim 26 rejected under 35 U.S.C. 103(a) as being unpatentable over Aarts et al. as applied to claim 24 above in view of Iwamatsu (US Patent 5,040,220). Aarts et al. discloses an acoustic method which the filter means has a cut-off frequency on the bass side substantially equal to 200 Hz and a cut-off frequency on the higher pitch side which is substantially equal to 400 Hz (Aarts et al. discloses a band-pass filter for selecting a part of the frequency spectrum of an audio signal which could include cut-off frequencies of 200 and 400 Hz) (Column 4, lines 60-62). Aarts et al. does not disclose the response as 12dB/OCT for the bass side and 24dB/OCT on the higher pitch side. Iwamatsu discloses a filter where the cut-off frequencies have gradients which can be set to either 12dB/OCT, 18dB/OCT, or 24 dB/OCT. It is known in the art that a filter response having a steeper slope as seen in Fig. 6 will pass fewer frequencies outside its bandwidth than a filter with a frequency response having a cut-off which is not as steep. Therefore, it would have been obvious to one of ordinary skill in the art at the

time the invention was made to use a cut-off response on the order of 12dB/OCT for the bass side and have a response or 24dB/OCT or greater on the high frequency side in order to obtain a more effective filter to pick the frequencies wanted.

15. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Aarts et al. and Iwamatsu as applied to claim 26 above, and further in view of Jackson (US Patent 6,504,935). Aarts et al. as modified discloses an acoustic effect method. Aarts et al. as modified does not disclose distortion means being non-linear and asymmetric. Jackson discloses distortion-applying means (Fig. 20b) that has an input-output response which is a non-linear and has no point symmetry with respect to the center of an input amplitude. It is known in the art that nonlinear transfer functions can be used to apply distortion to a signal. Jackson sites several examples of prior art that incorporate the use of non-linear processing and waveshaping for distortion (Columns 1 and 2). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a nonlinear and asymmetrical response to produce distortion.

16. Claims 29, 30, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jackson as applied to claim 28 above, and further in view of Aarts et al. (US Patent 6,111,960) and Iwammatsu (US Patent 5,040,220).

Regarding Claim 29, Jackson discloses a recording medium according to Claim 28. Jackson does not disclose the cut-off response of the filter means. Aarts et al.

discloses a circuit (Fig. 1) for processing an audio signal comprising filter means that have a cut-off frequency on the bass side which is chosen in a range of 50~300Hz and has a cut-off frequency on the higher pitch side which is chosen to be in a range of 200~400Hz. (Aarts et al. discloses the selector means (filter 20) can be set to select a frequency band of an audio signal (Column 1, lines 6-11), which could include 50~300Hz on the bass side and 200~450Hz on the higher pitch side). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a selectable frequency band filter as disclosed by Aarts et al. in order to select frequencies within a desired range. Jackson as modified does not disclose the use of cut-off response of 24 dB for the high pitch side and 12 dB for the bass side. Iwamatsu discloses a filter where the cut-off frequencies have gradients which can be set to either 12dB/OCT, 18dB/OCT, or 24 dB/OCT. It is known in the art that a filter response having a steeper slope as seen in Fig. 6 will pass less frequencies outside it's desired bandwidth than a filter with a frequency response having a cut-off which is not as steep. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a cut-off response on the order of 12dB/OCT for the bass side and have a response or 24dB/OCT or greater on the high frequency side in order to obtain a more effective filter to pick the frequencies wanted.

Regarding Claim 30, Aarts et al. further discloses a circuit for processing an audio signal comprising filter means (filter 20) that have a cut-off frequency on the bass side which is substantially equal to 200Hz and a cut-off frequency on the higher pitch side which is substantially equal to 400Hz (Aarts et al. discloses the selector means

(filter 20) can be set to select a frequency band of an audio signal, which could include 200Hz on the bass side and 400Hz on the higher pitch side) (Column 1, lines 6-11).

Regarding Claim 35, Jackson discloses a device according to claims 28 and 32 as stated above. Jackson does not disclose a low pass filter which can be used to gradually reduce component data corresponding to the double overtone region to which the non-linear distortion is added. Aarts et al. discloses a bandpass filter (Fig. 1, reference 24) which can be configured as a low pass filter to gradually reduce the component data corresponding to the double overtone region to which the non-linear distortion is added by generator 22 as the component data goes toward the higher pitch. Aarts et al. teaches that the band-pass filter serves to eliminate any low and high frequencies (Column 4, lines 62-64). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a filter after the distortion means to manipulate the distorted signal as taught by Aarts et al.

17. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jackson as applied to claim 28 above in view of Hahne (US Patent 4,797,933). Jackson discloses a device as stated in Claim 28. Jackson does not disclose a high pass filter with a cutoff on the bass side and a low pass filter with a cut-off response on the higher side. Hahne discloses a response (Figure 5) in which a high pass filter has a cut-off response on the bass side and a low pass filter with a cut-off response on the higher pitch side.

### *Allowable Subject Matter*

18. Claims 1-14 allowed.

### *Conclusion*

19. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Justin Michalski whose telephone number is (703)305-5598. The examiner can normally be reached on 8 Hours, 5 day/week.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Isen can be reached on (703)305-4386. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JIM

XU MEI
PRIMARY EXAMINER